

ABSTRACT OF THE INVENTION

A wrap spring clutch syringe ram pushes at least one syringe with virtually instantaneous starting and stopping, and with constant motion at a defined velocity during the intervening push. The wrap spring clutch syringe ram includes an electric motor, a computer, a flywheel, a wrap spring clutch, a precision lead screw, a slide platform, and syringe reservoirs, a mixing chamber, and a reaction incubation tube. The electric motor drives a flywheel and the wrap spring clutch couples the precision lead screw to the flywheel when a computer enables a solenoid of the wrap spring clutch. The precision lead screw drives a precision slide which causes syringes to supply a portion of solution into the mixing chamber and the incubation tube. The wrap spring clutch syringe ram is designed to enable the quantitative study of solution phase chemical and biochemical reactions, particularly those reactions that occur on the subsecond time scale.